Nahid Zoueshtiagh/R9/USEPA/US
03/08/2006 01:03 PM

To Joseph Lapka/R9/USEPA/US@EPA
cc
bcc
Subject pre-app record - Emission Summaries FSRU Offshore Project

fyi

----- Forwarded by Nahid Zoueshtiagh/R9/USEPA/US on 03/08/2006 01:03 PM -----

KWright@entrix.com
05/23/2003 05:54 PM

To Nahid Zoueshtiagh/R9/USEPA/US@EPA
cc TUmenhofer@entrix.com
Subject Emission Summaries FSRU Offshore Project

Nahid:

Per our meeting on Thursday, May 22, 2003, you requested emission summaries for our proposed project. Please find attached the following two spreadsheets:

FSRU PSD Summary: This file includes two worksheets: Stationary sources controlled, and stationary sources uncontrolled.

Vessel PSD Summary: This file also contains two worksheets: Mobile sources (Vessels) controlled, and mobile sources uncontrolled.

Again, thank you for arranging the meeting last Thursday. Should you have any questions concerning the attached data, please contact me.

Kevin Wright
Air Resources
ENTRIX, Inc.
TEL 805-477-5007
FAX 805-658-0612

 FSRU PSD Summary.xls  Vessel PSD Summary.xls

FSRU Controlled Summary

EMITTENT NAME	Tons per Year (Controlled)						
	Main Gens	Backup Gen	Vaporizers	Fire Pump	Life Boat	Diesel Tank	Total
Nitrogen Oxides (as NO_2)	16.3	8.9	38.6	1.2	0.06	-	**65.1**
Reactive Organic Compounds (ROC) as CH_4	16.3	1.0	1.4	0.2	0.00	0.016	**18.8**
Carbon Monoxide (CO)	21.7	1.6	29.4	1.5	0.01	-	**54.2**
Sulfur Dioxide (SO_2)	0.048	0.004	0.130	0.001	0.000	-	**0.18**
Particulates (as PM_{10})	4.9	0.3	4.0	0.1	0.00	-	**9.3**
Carbon Dioxide (CO_2)	35,082	598	90,481	99	2.32	-	**126,262**
Ammonia Slip (NH_3)	4.0	-	-	-	-	-	**4.0**

EMITTENT NAME	Emission Rates (Controlled)						
	Main Gens	Backup Gen	Backup Gen	Vaporizers	Vaporizers	Fire Pump	Life Boat
	g/BHP-hr	g/BHP-hr gas	g/BHP-hr D2	ppmv @ 3%	lb/mmBTU	g/BHP-hr	g/BHP-hr
Nitrogen Oxides (as NO_2)	0.150	0.911	10.746	40.0	0.0486	6.90	14.00
Reactive Organic Compounds (ROC) as CH_4	0.150	0.916	0.385	4.1	0.0017	1.00	0.83
Carbon Monoxide (CO)	0.200	1.541	0.607	50.0	0.0370	8.50	2.54
Sulfur Dioxide (SO_2)	0.0004	0.0005	0.0044	0.1	0.0002	0.01	0.01
Particulates (as PM_{10})	0.045	0.045	0.380	0.0034	0.0050	0.38	0.84
Carbon Dioxide (CO_2)	323.469	327.344	454.608	98,000	113.8128	560.64	560.64
Ammonia Slip (NH_3)	0.037						

Device Notes:
Main generators operating at 100% load for 12,800 total machine hours per year, 2 of 3 devices running at any one time, gas fuel
Backup generator operating at 100% load for 200 machine hours per year, dual fuel, 100 hours on gas, 100 hours on diesel fuel
Vaporizers operating at 100% load for 8,000 machine hours per year each, 5 devices, 40,000 machine hours total, gas fuel
Fire pump operating at 100% load for 200 machine hours per year, diesel fuel
Life Boat exercising at 100% load for 50 machine hours per year each, 1 device, diesel fuel
Diesel Storage Tank, 30,000 gallon capacity, throughput based on diesel fuel usage defined above for applicable devices

FSRU Uncontrolled Summary

EMITTENT NAME	Tons per Year (Uncontrolled)						
	Main Gens	Backup Gen	Vaporizers	Fire Pump	Life Boat	Diesel Tank	Total
Nitrogen Oxides (as NO_2)	97.7	8.9	38.6	1.2	0.06	-	**146.5**
Reactive Organic Compounds (ROC) as CH_4	56.6	1.0	1.4	0.2	0.00	0.016	**59.2**
Carbon Monoxide (CO)	171.7	1.6	29.4	1.5	0.01	-	**204.3**
Sulfur Dioxide (SO_2)	0.048	0.004	0.130	0.001	0.000	-	**0.18**
Particulates (as PM_{10})	4.9	0.3	4.0	0.1	0.00	-	**9.3**
Carbon Dioxide (CO_2)	35,082	598	90,481	99	2.32	-	**126,262**
Ammonia Slip (NH_3)	-	-	-	-	-	-	**-**

EMITTENT NAME	Emission Rates (Uncontrolled)						
	Main Gens	Backup Gen	Backup Gen	Vaporizers	Vaporizers	Fire Pump	Life Boat
	g/BHP-hr	g/BHP-hr gas	g/BHP-hr D2	ppmv @ 3%	lb/mmBTU	g/BHP-hr	g/BHP-hr
Nitrogen Oxides (as NO_2)	0.900	0.911	10.746	40.0	0.0486	6.90	14.00
Reactive Organic Compounds (ROC) as CH_4	0.522	0.916	0.385	4.1	0.0017	1.00	0.83
Carbon Monoxide (CO)	1.583	1.541	0.607	50.0	0.0370	8.50	2.54
Sulfur Dioxide (SO_2)	0.0004	0.0005	0.0044	0.1	0.0002	0.01	0.01
Particulates (as PM_{10})	0.045	0.045	0.380	0.0034	0.0050	0.38	0.84
Carbon Dioxide (CO_2)	323.469	327.344	454.608	98,000	113.8128	560.64	560.64
Ammonia Slip (NH_3)	-						

Device Notes:
Main generators operating at 100% load for 12,800 total machine hours per year, 2 of 3 devices running at any one time, gas fuel
Backup generator operating at 100% load for 200 machine hours per year, dual fuel, 100 hours on gas, 100 hours on diesel fuel
Vaporizers operating at 100% load for 8,000 machine hours per year each, 5 devices, 40,000 machine hours total, gas fuel
Fire pump operating at 100% load for 200 machine hours per year, diesel fuel
Life Boat exercising at 100% load for 50 machine hours per year each, 1 device, diesel fuel
Diesel Storage Tank, 30,000 gallon capacity, throughput based on diesel fuel usage defined above for applicable devices

Vessels Controlled Summary

EMITTENT NAME	Tons Per Year (CA diesel fuel, LNG Carrier on Gas)					
	Assist Tugs	Crew Boat	Supply Boat	Total		LNG Carrier
Nitrogen Oxides (as NO_2)	98.6	1.6	13.0	**113.3**		106.2
Reactive Organic Compounds (ROC) as CH_4	5.8	0.1	0.8	**6.7**		14.8
Carbon Monoxide (CO)	17.9	0.3	2.4	**20.6**		69.8
Sulfur Dioxide (SO_2)	0.04	0.001	0.005	**0.0**		0.0
Particulates (as PM_{10})	5.9	0.1	0.8	**6.8**		1.3
Carbon Dioxide (CO_2)	3,951	66	521	**4,538**		13,786

EMITTENT NAME	Emission Rates (CA diesel fuel, LNG Carrier on Gas)					
	Assist Tugs	Crew Boat	Supply Boat	Average		LNG Carrier
	g/BHP-hr	g/BHP-hr	g/BHP-hr	g/BHP-hr		g/BHP-hr
Nitrogen Oxides (as NO_2)	14.00	14.00	14.00	14.00		2.44
Reactive Organic Compounds (ROC) as CH_4	0.83	0.83	0.83	0.83		0.34
Carbon Monoxide (CO)	2.54	2.54	2.54	2.54		1.61
Sulfur Dioxide (SO_2)	0.01	0.01	0.01	0.01		0.00
Particulates (as PM_{10})	0.84	0.84	0.84	0.84		0.03
Carbon Dioxide (CO_2)	560.64	560.64	560.64	560.64		317.47

Vessel Notes:
Assist tugs (pair) conducting LNG carrier to FSRU berthing operations 120 times per year, time & load weighted engine operation
Crew boat making weekly round trip to FSRU, time & load weighted engine operation
Supply boat making semi-weekly round trip to FSRU, time & load weighted engine operation
LNG carrier to FSRU berthing operations, 14 miles slow, 3 miles to FSRU with assist tugs, time & load weighted engine operation

Vessels Uncontrolled Summary

EMITTENT NAME	Tons Per Year (CA diesel fuel)					
	Assist Tugs	Crew Boat	Supply Boat	Total		LNG Carrier
Nitrogen Oxides (as NO_2)	98.6	1.6	13.0	**113.3**		550.5
Reactive Organic Compounds (ROC) as CH_4	5.8	0.1	0.8	**6.7**		43.9
Carbon Monoxide (CO)	17.9	0.3	2.4	**20.6**		161.9
Sulfur Dioxide (SO_2)	0.04	0.001	0.005	**0.0**		0.2
Particulates (as PM_{10})	5.9	0.1	0.8	**6.8**		16.2
Carbon Dioxide (CO_2)	3,951	66	521	**4,538**		20,553

EMITTENT NAME	Emission Rates (CA diesel fuel)					
	Assist Tugs	Crew Boat	Supply Boat	Average		LNG Carrier
	g/BHP-hr	g/BHP-hr	g/BHP-hr	g/BHP-hr		g/BHP-hr
Nitrogen Oxides (as NO_2)	14.00	14.00	14.00	14.00		12.68
Reactive Organic Compounds (ROC) as CH_4	0.83	0.83	0.83	0.83		1.01
Carbon Monoxide (CO)	2.54	2.54	2.54	2.54		3.73
Sulfur Dioxide (SO_2)	0.01	0.01	0.01	0.01		0.00
Particulates (as PM_{10})	0.84	0.84	0.84	0.84		0.37
Carbon Dioxide (CO_2)	560.64	560.64	560.64	560.64		473.32

Vessel Notes:
Assist tugs (pair) conducting LNG carrier to FSRU berthing operations 120 times per year, time & load weighted engine operation
Crew boat making weekly round trip to FSRU, time & load weighted engine operation
Supply boat making semi-weekly round trip to FSRU, time & load weighted engine operation
LNG carrier to FSRU berthing operations, 14 miles slow, 3 miles to FSRU with assist tugs, time & load weighted engine operation